

Notice of Allowability

Application No.

10/748,286

Examiner

Laura M. Schillinger

Applicant(s)

NOGUCHI ET AL.

Art Unit

2813

CM

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12/31/03.
2. ☒ The allowed claim(s) is/are 1-10.
3. ☒ The drawings filed on 31 December 2003 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 12/31/03
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Laura M Schillinger
Primary Examiner
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DETAILED ACTION***Allowable Subject Matter***

Claims 1-10 are allowed.

The following is an examiner's statement of reasons for allowance:

In reference to claim 1, Ng et al (US 6709918) teaches a method comprising:

- a) preparing a semiconductor substrate (Fig. 1 (7));
- b) forming, on the semiconductor substrate, a first insulation film (8)
where a first interconnect (10) with copper-based first conductor film and
a capacitor bottom (20A) are buried (Fig. 1);
- c) forming a second insulation film (14) on the first insulation film (8)
where the first interconnect (10) and the bottom electrode (20A) are buried
(Fig. 2);
- d) forming a third insulation film (26) on the second insulation film (14)
(Fig. 3) ;
- e) forming a first hole by removing a selected area of the third insulation
film (Fig. 4 (26)) ;
- f) forming a capacitor top electrode (24A) with a second conductor film in
the first hole (Fig. 4- note that layer 24A may be considered "in" the hole
as claimed due to the etching of holes on both sides of layer 24A- the
Examiner considers this "in the first hole);
- g) forming a fourth insulation film (30) on the third insulation film (26)
where the top electrode (24A) is buried (Fig. 5) ;

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- h) forming a second hole(6) and a third hole (6) to expose the top electrode (24A) by removing a selected are of the fourth insulation film (30), and forming a fourth hole (6) (Fig.5) and
- i) filling a copper-based third conductor film into the second hole, the third hole and the fourth hole (Fig.6 and Col.6, lines: 35-50).

However, Ng et al ('918) fails to teach nor suggest Applicant's additional claimed limitation of step (h) which includes forming a fourth hole **to expose the first interconnect by removing selected areas of the third insulation film and the second insulation film at the bottom of the second hole**. In contrast, the damascene copper interconnects are already formed to connect to underlying interconnect layer 10 (Fig.7) therefore there is no suggestion to modify Ng to further include an additional contact hole extending to the interconnect layer as claimed by the Applicant. Claim 1 therefore contains allowable subject matter. Claims 2-10 act to further narrow independent claim 1 and are therefore also in condition for allowance.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

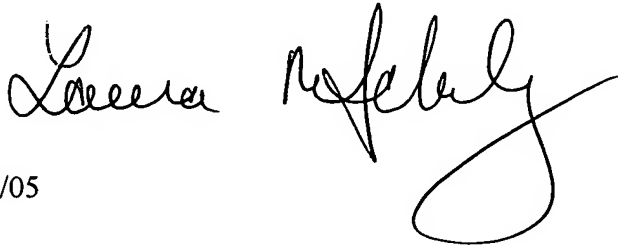
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M. Schillinger whose telephone number is (571) 272-1697. The examiner can normally be reached on M-T, R-F 7:00-5:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Laura M. Schillinger', followed by a large, stylized flourish or loop.

Laura M Schillinger
Primary Examiner
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4/1/05